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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/534,204	03/24/2000	Shinji Imai	Q56555	2972

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EXAMINER

LEE, SHUN K

ART UNIT PAPER NUMBER

2878

DATE MAILED: 12/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/534,204

Applicant(s)

IMAI ET AL.

Examiner

Shun Lee

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8,31-36 and 59-61 is/are pending in the application.
- 4a) Of the above claim(s) 32,33,35,36,60 and 61 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-8,31,34 and 59 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 10 October 2002 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of species I (claims 1-8) in Paper No. 12 has been acknowledged.
2. Applicant has canceled claims 9-30 and 37-58 and has added claims 59-61. Applicant has failed to provide a listing of all claims subsequently added that are readable on the elected species. Claim 60 recite the limitation of further comprising an array of spaced apart electrodes disposed in a first direction. Thus, it appears that claims 60 and 61 belong with the nonelected species of optional stripe electrode. Therefore, claims 32, 33, 35, 36, 60, and 61 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 12.

Drawings

3. The proposed drawing correction and/or the proposed substitute sheets of drawings, filed on 10 October 2002 have been approved. A proper drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The correction to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 59 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 59 recites the limitation "the voltage fluctuation means monitors an output voltage during image read out and corrects the voltage of a power source based on stored voltage correction data". However, the specification as filed only discloses (first paragraph on pg. 18) suppressing fluctuations of the voltage of the power source or correcting the image signal (*i.e.*, by software; last paragraph on pg. 75) but fails to disclose monitoring an output voltage during image read out and corrects the voltage of a power source based on stored voltage correction data.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 31 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 31, the phrase "e.g." (*i.e.*, for example) renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

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8. Claim 59 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: output voltage and power source to other elements within the claims.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-4, 5-8, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van den Bogaert (Research Disclosure 34264, October 1992) in view of Tsuji *et al.* (US 5,196,702) and Takahashi *et al.* (US 5,059,794).

In regard to claims 5-7, Van den Bogaert discloses (Fig.) an image read-out system comprising:

- (a) a stimulating light source (left column, lines 39-43) which emits stimulating light (7) in a wavelength range of greater than 600 nm,
- (b) a stimulating light scanning means (left column, lines 49-57) which causes the stimulating light (7) emitted from the stimulating light source to scan a stimuable phosphor sheet (1) having a layer of stimuable phosphor which emits stimulated emission in a wavelength range less than 500 nm (*i.e.*, 390 nm; right column, lines 13-17) in proportion to the stored energy of radiation upon exposure to the stimulating light (7),
- (c) a solid image sensor (left column, lines 17-33) having a photoconductive material layer (3) the major component of which is a-Se (right column, lines 13-17) and which exhibits electric conductivity upon exposure to the stimulated emission from the stimuable phosphor sheet (1),
- (d) an electric voltage imparting means (6) which imparts an electric voltage to the photoconductive material layer (3) of the solid image sensor to apply an electric field in the photoconductive material layer (3), and
- (e) an image signal obtaining means (5, 8) which detects electric charges generated in the photoconductive material layer (3) of the solid image sensor when the stimuable phosphor sheet (1) is exposed to the stimulating light (7) and stimulated emission emitted from the stimuable phosphor sheet (1) impinges upon the photoconductive material layer (3) with an electric voltage imparted to the

photoconductive material layer (3) by the electric voltage imparting means (6) to apply the electric field in the photoconductive material layer (3), and detects an image signal representing an image stored on the stimuable phosphor sheet (1).

The image read-out system of Van den Bogaert lacks that said photoconductive material layer of the solid image sensor is 1 μm to 100 μm (or 10 μm to 50 μm) in thickness and wherein the electric field generates an avalanche amplification effect. The properties of the a-Se photoconductive material layer of Van den Bogaert is well known in the art. For example, Tsuji *et al.* teach (column 24, lines 15-39) to provide a 0.1 μm to 500 μm a-Se photoconductive material layer and to apply an electric field sufficient for avalanche amplification in order to enhance the quantum efficiency of the a-Se photoconductive material layer for the light. As another example, Takahashi *et al.* teach to provide a-Se photoconductive material layer (e.g., 2 μm thick; column 6, lines 15-39) and to apply an electric field to the a-Se photoconductive material layer sufficient for avalanche amplification in order to increase optical detection sensitivity (column 2, lines 18-22 and 47-58) when using a laser stimuable phosphor. Therefore it would have been obvious to one having ordinary skill in the art to provide a 0.1 μm to 500 μm a-Se photoconductive material layer in the image read-out system of Van den Bogaert, and to apply an electric field sufficient for avalanche amplification in order to enhance the quantum efficiency of the a-Se photoconductive material layer for the light.

In regard to claims 1-3, the method steps are implicit for the modified apparatus of Van den Bogaert since the structure is the same as the applicant's apparatus of claims 5-7.

In regard to claim 4 (which is dependent on claim 1), claim 8 (which is dependent on claim 5), and claim 59 (which is dependent on claim 8 in so far as understood), the image read-out system of Van den Bogaert lacks that fluctuation of the image signal due to fluctuation in the electric field applied to the photoconductive material layer is suppressed by a fluctuation suppressing means. Photoconductor quantum efficiency as a function of applied electric field is well known in the art. For example, Tsuji *et al.* teach (Fig. 10; column 22, lines 34-62) that there is a steep increase in quantum efficiency when the applied electric field increases. As another example, Takahashi *et al.* teach (Fig. 3) that there is a steep increase in quantum efficiency when the applied electric field increases. It is important to recognize that quantum efficiency denotes efficiency for conversion of light into charge (e.g., see Eq. 4 of Takahashi *et al.*). Since a change in quantum efficiency results a changed electrical signal for the same light quantity, quantum efficiency must be constant in order to obtain the same electrical signal for the same incident light quantity. Thus it is clear that a fluctuating quantum efficiency results in fluctuations of the electrical signals even when incident light quantity is constant. A constant quantum efficiency indicates a constant applied electric field. Therefore it would have been obvious to one having ordinary skill in the art to provide a fluctuation suppressing means (e.g., a constant voltage source) in the image read-out system of Van den Bogaert, in order to read out an electrical signal that corresponds to the light quantity by minimizing variations in quantum efficiency.

12. Claims 31 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van den Bogaert (Research Disclosure 34264, October 1992) in view of Tsuji *et al.* (US 5,196,702), Takahashi *et al.* (US 5,059,794) and Hunter *et al.* (US 6,192,105).

In regard to claim **34**, Van den Bogaert is applied as in claim 5 above.

Van den Bogaert also discloses (left column, lines 36-39) a stimuable phosphor layer having a prompt emission (*i.e.*, momentary light emitted from the stimuable phosphor layer upon exposure to the recording light). Since the prompt emission and the photostimulated emission has the same wavelength range (see Van den Bogaert left column, lines 34-39), it is inherent that the photoconductive material layer exhibits electric conductivity upon exposure to either photostimulated or prompt emission from the stimuable phosphor layer. Tsuji *et al.* teach (column 24, lines 15-39) that a photoconductive material layer exhibits electric conductivity upon exposure to the recording light (*i.e.*, X-ray). The image read-out system of Van den Bogaert lacks a preliminary read-out image signal obtaining means which obtains a preliminary read-out image signal bearing thereon image information by detecting charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer. Hunter *et al.* teach (Fig. 7) to provide an automatic exposure control device comprising at least one photoconductor (*e.g.*, a-Se) detector in order to obtain the correct x-ray exposure (column 1, lines 13-23). Therefore it would have been obvious to one having ordinary skill in the art to use the image read-out system of Van den Bogaert as a preliminary read-out image signal obtaining means in order to obtain the correct x-ray exposure as taught by Hunter *et al.*

In regard to claim 31, the method steps are implicit for the modified apparatus of Van den Bogaert since the structure is the same as the applicant's apparatus of claim 34.

Response to Arguments

13. Applicant's arguments with respect to claims 1-8, 31, and 24 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL
December 18, 2002


CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878